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2010 OTTER AND BEAVER HARVEST SURVEY

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ABSTRACT

A survey was completed to determine the number of otter harvest tag holders that set traps for otter and beaver, the number of animals caught, the types of traps used, and the number of days they trapped. In 2010, 2,949 furtakers obtained a harvest tag to take otter, which was 15% more than in 2009*. About 27% of the tag holders set traps for otter (803 trappers) and 44% set traps for beaver (1,306). Trappers that targeted otter spent nearly 17,130 days trapping otter ($\bar{x}$ = 21 days/trapper), captured 741 otter (included animals released alive), and registered 707 otter. An additional 207 otter were registered by trappers that were not targeting otter. The total number of otter registered by all trappers combined did not change significantly between 2009 and 2010. About 58% of trappers targeting otter captured at least one otter. The number of trappers that attempted to catch otter and their trapping effort (days afield) were not significantly different between 2009 and 2010. The mean number of days of effort per registered otter in 2010 (24.2 days) increased significantly by 18% from 2009. Beaver trappers spent nearly 29,736 days trapping beaver ($\bar{x}$ =23 days/trapper) and captured 13,423 beaver. About 88% of active beaver trappers captured at least one beaver. The number of trappers that attempted to catch beaver increased significantly by 7%; however, their days spent trapping and their harvest of beaver were not significantly different between 2009 and 2010.*

INTRODUCTION

The Michigan Natural Resources Commission and the Department of Natural Resources (DNR) have the authority and responsibility to protect and manage the wildlife resources of the state of Michigan. Harvest surveys are a management tool used to help accomplish this statutory responsibility. The main objectives of this harvest survey were to determine the number of trappers who set traps for otter (*Lontra canadensis*), the types of traps used, the

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number of days they trapped, and the number of animals captured. Because otter trappers frequently seek to catch beaver (*Castor canadensis*), they also were asked whether they attempted to trap beaver. If they trapped beaver, they were asked to report the number of days they trapped and the number of beaver caught.

While the primary objectives of this survey were estimating harvest, trapper numbers, and trapping effort, this survey also provided an opportunity to collect information about management issues. Questions were added to the questionnaire to determine how often trappers set snares in open water for beaver and how often trappers attempted to capture beaver during April.

In 2010, the state was divided into three management zones (Figure 1), and the otter and beaver trapping seasons were different for each zone (Table 1). Seasons also differed for residents and nonresidents of Michigan. In order to trap otter, trappers were required to obtain a free otter harvest tag in addition to a fur harvesters license (included Fur Harvester, Junior Fur Harvester, Senior Fur Harvester, Non-resident Fur Harvester, Military Fur Harvester, Resident Fur [trap only], and Junior Fur [trap only]). Beaver trappers also were required to purchase a fur harvesters license but did not need a harvest tag. Trappers were limited to three otter, except no more than one otter could be taken in Zone 2 and one otter from Zone 3. No maximum limit was set for the number of beaver that could be harvested. Successful trappers were required to register all otter taken by May 4, 2011, but trappers were not required to register beaver. Trappers were not allowed to keep incidentally caught otter. However, trappers were required to bring these incidentally caught otter to a registration station if they could not be released alive. Trappers could use body-gripping (conibear type) traps and foothold traps to capture otter and beaver. In addition, trappers could use snares to capture beaver from December 1 through March 31. Snares could be set in the water or under ice. Snares had to be made of 1/16-inch or larger cable. If a snare was not set under ice, at least half of the snare had to be under water, and it had to be set so it would hold a captured beaver completely under the water.

METHODS

A questionnaire (Appendix A) was sent to everyone who obtained an otter harvest tag in 2010 (2,949 harvest tag holders). Trappers receiving the questionnaire were asked to report if they trapped otter or beaver, number of days spent afield, number of otter and beaver caught, number of otter released alive, and number of otter registered (registration estimates included incidentally caught animals that were not returned to the trapper). Trappers were also asked to indicate their impression of the status of the otter and beaver populations in the county where they primarily trapped (i.e., absent, stable, increasing, or decreasing).

Questionnaires were mailed initially during early May 2011, and nonrespondents were mailed up to two follow-up questionnaires. Although 2,949 people were sent the questionnaire, 110 surveys were undeliverable, resulting in an adjusted sample size of 2,839. Questionnaires were returned by 1,727 people, yielding a 61% adjusted response rate.

Although all harvest tag holders were sent a questionnaire, not all questionnaires were returned. To extrapolate from the tag holders that returned their questionnaire to all people obtaining harvest tags, estimates were calculated using a simple random sampling design

(Cochran 1977) and were presented along with their 95% confidence limit (CL). This CL can be added and subtracted from the estimate to calculate the 95% confidence interval. The confidence interval is a measure of the precision associated with the estimate and implies the true value would be within this interval 95 times out of 100. Estimates were not adjusted for possible response or nonresponse bias. The 2010 estimate of otter registered included incidental animals that trappers were not allowed to keep (i.e., harvest exceeding the bag limit); however, it did not include animals taken by trappers as part of a nuisance control business.

Furtakers trapping beaver were not required to obtain an otter harvest tag; thus, estimates associated with beaver trapping do not include all furtaker participation, effort, or harvest. Rather, these estimates only represent the participation, effort, or harvest of trappers that obtained an otter harvest tag.

Statistical tests are used routinely to determine the likelihood the differences among estimates are larger than expected by chance alone. The overlap of 95% confidence intervals was used to determine whether estimates differed. Non-overlapping 95% confidence intervals was equivalent to stating the difference between the means was larger than would be expected 995 out of 1,000 times ($P < 0.005$), if the study had been repeated (Payton et al. 2003).

RESULTS AND DISCUSSION

Otter

In 2010, 2,949 trappers obtained harvest tags to trap otter, which was 15% more than the 2,561 trappers with tags in 2009. In 2010, most of the harvest tags (2,818) were obtained by men. Harvest tags were obtained by 125 women, and the sex of 6 tag holders was unknown. About 27% of the otter tag holders set traps targeting otter (803 trappers, Table 2). These trappers spent 17,130 days trapping otter ($\bar{x}$ = 21.3 ± 1.4 days/trapper), captured 741 otter, and registered 707 otter (Table 3). About 58% of trappers successfully captured at least one otter.

The estimated number of otter registered by trappers that targeted otter did not change significantly between 2009 and 2010 (754 versus 707 otter, Table 3). An additional 207 otter were registered by trappers that were not targeting otter. The estimated total number of otter registered by all trappers combined did not change significantly between 2009 and 2010 (1,022 versus 914 otter, Table 3). The management zone with the greatest number of otter captured by all trappers combined was the Upper Peninsula Management Zone (548 otter, Table 4), and among counties, Ontonagon (68), Chippewa (61) and Gogebic (56) counties had the highest harvest estimates (Table 5).

The number of otter registered (including incidental take) by trappers at registration stations decreased 8% between 2009 and 2010 (1,030 versus 948 otter, Figure 2). The number of trappers that attempted to catch otter and their effort did not change significantly between 2009 and 2010 (Table 3, Figure 2). Among trappers targeting otter, the mean number of days of effort per registered otter was 24.2 days in 2010, which was significantly greater (18%) than the 20.6 days in 2009 (Tables 3 and 6, Figure 3).

The number of otter registered in 2010 was 9% above the long-term yearly average since 1950 ($\bar{x}$ = 873 during 1950-2010, Figure 4). Changes in otter harvest during recent years have tracked changes in trapping effort (Figure 2) and changes in otter pelt prices (Figures 5 and 6). Although otter harvest has declined in recent years, estimates of effort per catch for otters have not changed significantly; suggesting otter numbers were stable statewide (Figure 3).

The number of otter registered was correlated with the mean value of otter pelts during 1989-2009 (Pearson product moment correlation coefficient [r] = 0.82, probability of obtaining this result [P] < 0.01) (Figure 6). The correlation between mean days of effort per registered otter and pelt prices during 1997-2009 (r = 0.79, P < 0.01) was also significant.

Most otter trappers used conibear-type traps to capture otter (92 ± 2%), although foothold traps also were used frequently (37 ± 3%). Among trappers using conibear traps, the mean number of conibear traps set was 4.7 ± 0.3 traps. Among trappers using foothold traps, the mean number of foothold traps set was 4.4 ± 0.4 traps.

Thirty-four percent of otter trappers (±3%) believed otter numbers were increasing in the county where they trapped most often, while 54 ± 3% thought otter numbers were stable, 9 ± 2% thought otter were declining, 1 ± 1% indicated otter were not present, and 3 ± 1% did not comment on the status of otter.

Beaver

Furtakers trapping beaver were not required to obtain an otter harvest tag; thus, estimates associated with beaver trapping did not include all furtaker participation, effort, or harvest. Rather, these estimates only represent the participation, effort, or harvest of trappers that obtained an otter harvest tag. Furthermore, trappers taking beaver as part of a nuisance control business were asked to exclude nuisance animals from their reported harvest on annual harvest surveys beginning in 2003. Thus, estimates associated with beaver may not be directly comparable among years.

About 44% of the otter harvest tag holders set traps for beaver (1,306 trappers, Table 2). Trappers spent 29,736 days trapping (22.8 ± 1.2 days/trapper) and captured 13,423 beaver (Table 7). About 88 ± 1% of active trappers successfully captured at least one beaver. The greatest number of beaver were captured in the Upper Peninsula Management Zone (6,991 beaver, Table 8), and among counties, Chippewa (1,154), Ontonagon (808), and Marquette (690) counties had the highest harvest estimates (Table 9).

The number of people trapping beavers significantly increased 7% between 2009 and 2010 (1,218 versus 1,306 trappers, Table 7). The number of days spent trapping and the number of beaver harvested were similar between 2009 and 2010 (Table 7, Figure 7).

Most beaver trappers used conibear-type traps to capture beaver (91 ± 1%), although 60 ± 2% of trappers used foothold traps and 10 ± 1% used snares. Among trappers using conibear traps, the mean number of conibear traps set was 7.5 ± 0.4 traps. Among trappers using foothold traps, the mean number of foothold traps set was 6.2 ± 0.4 traps, and among trappers using snares, the mean number of snares set was 21.0 ± 11.4.

Twenty-one percent of beaver trappers (±2%) believed beaver numbers were increasing in the county where they trapped most often, while 53 ± 2% thought beaver numbers were stable, 22 ± 2% thought they were declining, and about 4% of trappers either indicated beaver were absent in the area they trapped or did not comment on the status of beaver.

An estimated 75 trappers caught 191 beaver with snares in open water during the 2010 season (Table 7). About 492 trappers caught 5,551 beaver during April 2010. Beaver harvested with snares in open water and taken during April represented about 1% and 34% of the estimated total beaver harvest, respectively. Among trappers that set traps for beaver, 15 ± 2% caught otter in their beaver sets. These trappers caught 287 ± 40 otter.

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Table 1. Otter and beaver trapping seasons in Michigan, 2010.

	Season	
Zone	Resident	Nonresident
1	October 25 – April 17[a]	November 15 – April 17
2	November 1 – April 17	November 24 – April 17
3	November 10 – March 31	December 15 – March 31

[a]The season extended through April 30 in Zone 1 on designated trout streams for residents.

Table 2. Estimated number of otter harvest tag holders that attempted to trap otter or beaver in Michigan during 2010 season.

Harvest tag holders	%	95% CL[a]	Total	95% CL[a]
Trapped only otter	6	1	179	21
Trapped only beaver	23	1	683	38
Trapped both otter and beaver	21	1	623	37
Trapped either otter or beaver	50	2	1,486	45
Trapped otter[b]	27	1	803	40
Trapped beaver[c]	44	2	1,306	44

[a]95% confidence limits.
[b]Sum of trappers that trapped only otter and trappers that trapped both otter and beaver.
[c]Sum of trappers that trapped only beaver and trappers that trapped both otter and beaver.

Table 3. Estimated number of otter trappers, their trapping effort (days), number of otter captured, mean days required to harvest an otter, and trapping success in Michigan during 2008-2010. Estimates presented separately for trappers targeting otter and for trappers that were not targeting otter.

	Year						
	2008		2009		2010		Change[a]
Variable	Estimate	95% CL	Estimate	95% CL	Estimate	95% CL	(%)
Among trappers targeting otter							
Trappers (No)	680	35	739	36	803	40	9
Effort (Days)	14,439	1,258	15,521	1,264	17,130	1,381	10
Otters captured (No.)	617	52	810	63	741	59	-8
Otters released alive (No.)	51	18	56	17	34	12	-39
Otters registered (No.)	566	47	754	57	707	56	-6
Trappers that captured an otter (%)	57	3	63	3	58	3	-5
Trappers that released an otter (%)	4	1	5	1	3	1	-1
Trappers that registered an otter (%)	56	3	63	3	58	3	-5
Mean days required to harvest an otter	25.6	2.4	20.6	1.7	24.2	1.9	18*
Among trappers that did not target otter							
Trappers (No)	129	17	195	21	155	20	-20
Otters captured (No.)	198	31	317	54	248	38	-22
Otters registered (No.)	198	31	268	36	207	33	-23
Among all trappers[b]							
Trappers (No)	808	36	919	38	944	42	3
Otters captured (No.)	815	59	1,127	81	989	69	-12
Otters registered (No.)	763	54	1,022	65	914	64	-11
Mean days required to harvest an otter	18.9	1.7	15.2	1.3	18.8	1.5	23*

[a]The change between 2009 and 2010 for proportion of trappers catching otters and registering otters is reported as the difference between years rather than the proportional change.

[b]Totals among all trappers may equal to sum of trappers targeting otter and trappers that did not target otter because of rounding error.

*P<0.005.

Table 4. Estimated number of trappers, trapping effort, otter captured, otter released alive, otter registered, and success among otter trappers during the 2010 Michigan trapping season, summarized by area.

	Trappers		Trapping effort (days)		Otter captured[a]		Otter released alive		Otter registered[b]		Trapper success	
Area	Total	95% CL[c]	Total	95% CL[c]	Total	95% CL[c]	Total	95% CL[c]	Total	95% CL[c]	%	95% CL[c]
Among trappers targeting otter												
Upper Peninsula	352	29	7,681	990	444	50	10	6	434	49	67	4
Lower Peninsula	473	33	9,428	1,011	290	32	24	10	266	29	50	4
Zone 2	333	28	5,927	801	198	25	17	8	181	22	53	5
Zone 3	167	21	3,501	602	92	18	7	4	85	16	47	6
Unknown	9	5	22	18	7	4	0	0	7	4	80	23
Statewide	803	40	17,130	1,381	741	59	34	12	707	56	58	3
Among trappers that did not target otter												
Upper Peninsula	44	11	NA	NA	104	29	10	8	94	25	NA	NA
Lower Peninsula	109	17	NA	NA	138	23	31	12	108	19	NA	NA
Zone 2	80	15	NA	NA	99	20	24	10	75	16	NA	NA
Zone 3	31	9	NA	NA	39	13	7	7	32	10	NA	NA
Unknown	3	3	NA	NA	5	5	0	0	5	5	NA	NA
Statewide	155	20	NA	NA	248	38	41	15	207	33	NA	NA
Among all trappers combined												
Upper Peninsula	394	30	7,681	990	548	58	20	10	528	55	68	4
Lower Peninsula	574	35	9,428	1,011	429	40	55	15	374	34	57	3
Zone 2	406	31	5,927	801	297	32	41	13	256	27	59	4
Zone 3	196	22	3,501	602	131	22	14	8	118	19	55	6
Unknown	12	6	22	18	12	6	0	0	12	6	86	17
Statewide	944	42	17,130	1,381	989	69	75	19	914	64	62	3

[a]All otter removed from traps, including all incidental catches and releases.
[b]Included incidentally caught otter that were not returned to the trapper.
[c]95% confidence limits.

Table 5. Estimated number of trappers, trapping effort, otter captured (including all incidental catches and releases), otter released alive, and otter registered (including incidental catches) among otter trappers during the 2010 Michigan trapping season, summarized by county.[a]

	Trappers		Trapping effort (days)		Otter captured[b]		Otter released alive		Otter registered[c]	
County	Total	95% CL[d]	Total	95% CL[d]	Total	95% CL[d]	Total	95% CL[d]	Total	95% CL[d]
Alcona	19	7	210	91	12	6	3	4	9	5
Alger	22	8	345	142	22	11	0	0	22	11
Allegan	5	4	75	68	2	2	0	0	2	2
Alpena	14	6	268	176	9	6	2	2	7	4
Antrim	7	4	75	50	3	3	0	0	3	3
Arenac	9	5	27	18	7	6	0	0	7	6
Baraga	32	9	516	217	36	15	0	0	36	15
Barry	10	5	215	150	9	5	0	0	9	5
Bay	7	4	96	76	7	4	0	0	7	4
Benzie	14	6	210	154	12	6	2	2	10	5
Berrien	0	0	0	0	0	0	0	0	0	0
Branch	2	2	12	15	0	0	0	0	0	0
Calhoun	7	4	113	80	2	2	0	0	2	2
Cass	3	3	111	99	0	0	0	0	0	0
Charlevoix	2	2	5	6	2	2	0	0	2	2
Cheboygan	19	7	294	133	14	7	0	0	14	7
Chippewa	55	12	751	228	67	20	5	5	61	19
Clare	27	9	285	163	22	9	3	3	19	7
Clinton	3	3	26	32	2	2	0	0	2	2
Crawford	9	5	133	114	3	3	0	0	3	3
Delta	24	8	449	193	19	9	0	0	19	9
Dickinson	22	8	381	220	34	16	3	4	31	14
Eaton	2	2	51	65	2	2	0	0	2	2
Emmet	3	3	51	65	2	2	0	0	2	2
Genesee	2	2	24	30	0	0	0	0	0	0
Gladwin	17	7	403	335	9	5	0	0	9	5
Gogebic	36	10	540	180	58	20	2	2	56	20
Gd. Traverse	17	7	249	133	9	5	0	0	9	5
Gratiot	12	6	131	79	5	4	0	0	5	4

[a]Included activity of trappers targeting otter and trappers not targeting otter combined.
[b]All otter removed from traps, including all incidental catches and releases.
[c]Included incidentally caught otter that were not returned to the trapper.
[d]95% confidence limits.

Table 5 (continued). Estimated number of trappers, trapping effort, otter captured (including all incidental catches and releases), otter released alive, and otter registered (including incidental catches) among otter trappers during the 2010 Michigan trapping season, summarized by county.[a]

	Trappers		Trapping effort (days)		Otter captured[b]		Otter released alive		Otter registered[c]	
County	Total	95% CL[d]	Total	95% CL[d]	Total	95% CL[d]	Total	95% CL[d]	Total	95% CL[d]
Hillsdale	0	0	0	0	0	0	0	0	0	0
Houghton	29	9	620	228	19	9	0	0	19	9
Huron	2	2	24	30	0	0	0	0	0	0
Ingham	2	2	53	67	0	0	0	0	0	0
Ionia	3	3	166	194	0	0	0	0	0	0
Iosco	17	7	412	226	7	5	2	2	5	4
Iron	34	10	785	405	36	14	0	0	36	14
Isabella	10	5	99	62	2	2	0	0	2	2
Jackson	2	2	34	43	0	0	0	0	0	0
Kalamazoo	0	0	0	0	0	0	0	0	0	0
Kalkaska	29	9	439	226	15	8	0	0	15	8
Kent	17	7	364	234	17	9	5	4	12	6
Keweenaw	7	4	145	110	9	8	0	0	9	8
Lake[d]	10	5	75	56	9	6	2	2	7	4
Lapeer	0	0	0	0	0	0	0	0	0	0
Leelanau	0	0	0	0	0	0	0	0	0	0
Lenawee	0	0	0	0	0	0	0	0	0	0
Livingston	7	4	114	90	3	3	0	0	3	3
Luce	34	10	453	160	43	16	0	0	43	16
Mackinac	32	9	476	163	41	15	2	2	39	14
Macomb	2	2	20	26	2	2	0	0	2	2
Manistee	20	7	324	166	10	7	3	4	7	4
Marquette	26	8	615	366	41	19	7	7	34	15
Mason	12	6	135	75	5	4	0	0	5	4
Mecosta	20	7	272	139	15	6	0	0	15	6
Menominee	24	8	570	330	19	9	0	0	19	9
Midland	14	6	294	209	3	3	0	0	3	3
Missaukee	39	10	278	107	41	14	12	8	29	9
Monroe	0	0	0	0	0	0	0	0	0	0

[a]Included activity of trappers targeting otter and trappers not targeting otter combined.
[b]All otter removed from traps, including all incidental catches and releases.
[c]Included incidentally caught otter that were not returned to the trapper.
[d]95% confidence limits.

Table 5 (continued). Estimated number of trappers, trapping effort, otter captured (including all incidental catches and releases), otter released alive, and otter registered (including incidental catches) among otter trappers during the 2010 Michigan trapping season, summarized by county.[a]

	Trappers		Trapping effort (days)		Otter captured[b]		Otter released alive		Otter registered[c]	
County	Total	95% CL[d]	Total	95% CL[d]	Total	95% CL[d]	Total	95% CL[d]	Total	95% CL[d]
Montcalm	32	9	466	216	17	7	0	0	17	7
Montmorency	17	7	248	144	14	7	0	0	14	7
Muskegon	12	6	268	165	12	6	2	2	10	5
Newaygo	12	6	89	53	9	6	2	2	7	4
Oakland	3	3	87	79	2	2	0	0	2	2
Oceana	14	6	260	166	12	6	3	3	9	5
Ogemaw	10	5	114	70	9	5	0	0	9	5
Ontonagon	48	11	705	263	70	22	2	2	68	22
Osceola	20	7	149	89	14	6	2	2	12	6
Oscoda	24	8	283	125	12	6	2	2	10	5
Otsego	12	6	97	72	9	6	2	2	7	5
Ottawa	5	4	56	65	7	7	5	6	2	2
Presque Isle	17	7	514	321	19	8	3	3	15	7
Roscommon	29	9	195	77	15	6	0	0	15	6
Saginaw	7	4	68	50	3	3	0	0	3	3
St. Clair	0	0	0	0	0	0	0	0	0	0
St. Joseph	9	5	65	50	7	4	0	0	7	4
Sanilac	0	0	0	0	0	0	0	0	0	0
Schoolcraft	24	8	330	175	36	14	0	0	36	14
Shiawassee	2	2	7	9	0	0	0	0	0	0
Tuscola	5	4	32	32	2	2	0	0	2	2
Van Buren	0	0	0	0	0	0	0	0	0	0
Washtenaw	0	0	0	0	0	0	0	0	0	0
Wayne	2	2	68	86	3	4	0	0	3	4
Wexford	14	6	193	105	5	4	0	0	5	4
Unknown	12	6	22	18	12	6	0	0	12	6
Statewide[e]	944	42	17,130	1,381	989	69	75	19	914	64

[a]Included activity of trappers targeting otter and trappers not targeting otter combined.
[b]All otter removed from traps, including all incidental catches and releases.
[c]Included incidentally caught otter that were not returned to the trapper.
[d]95% confidence limits.
[e]Number of trappers does not add up to statewide total because trappers could trap in more than one county. Column totals for trapping effort and capture may not equal statewide totals because of rounding errors.

Table 6. Mean days required to harvest an otter among trappers, 1997-2010.

	Region							
	Upper Peninsula		Northern Lower Peninsula		Southern Lower Peninsula		Statewide	
Year	Mean	95% CL[a]	Mean	95% CL[a]	Mean	95% CL[a]	Mean	95% CL[a]
1997	17.2	13.3	33.0	19.1	16.7	21.6	22.5	10.2
1998	13.6	5.6	21.5	11.2	34.0	28.0	16.2	5.2
1999	12.9	2.7	25.8	7.4	23.3	20.2	17.2	3.1
2000	15.3	5.4	31.2	10.9	23.0	15.7	19.9	4.9
2001	13.5	3.5	25.5	6.7	32.7	26.1	19.2	3.8
2002	27.0	9.0	25.6	9.5	26.5	14.8	26.2	6.3
2003	21.8	3.4	42.5	9.3	28.8	8.5	26.3	3.2
2004	23.1	5.8	36.7	11.1	62.5	29.1	29.3	5.5
2005	19.6	5.3	38.5	14.1	35.1	21.1	26.9	6.1
Among trappers targeting otter[b]								
2006	21.5	1.7	37.9	4.5	43.6	7.2	27.7	1.8
2007	23.7	2.6	42.8	6.5	33.5	7.2	28.7	2.4
2008	19.3	2.2	33.4	5.4	35.5	8.6	25.6	2.4
2009	14.1	1.5	31.2	4.3	34.7	6.7	20.6	1.7
2010	17.7	1.8	32.7	4.5	41.0	7.5	24.2	1.9
Among all trappers[b]								
2006	17.8	1.5	26.5	3.4	29.6	4.9	20.6	1.4
2007	20.7	2.3	31.7	5.0	24.8	5.1	22.8	1.9
2008	15.4	1.8	27.4	4.4	28.3	6.7	18.9	1.7
2009	11.0	1.2	20.7	2.9	23.6	4.6	15.2	1.3
2010	14.6	1.6	23.1	3.3	29.7	5.4	18.8	1.5

[a]95% confidence limits.

[b]Beginning in 2006, two separate estimates were calculated: (1) an estimate excluding the activity of trappers that did not target otter and (2) an estimate of all trappers combined. The latter estimates are more comparable to estimates from previous years.

Table 7. Estimated number of beaver trappers, their trapping effort (days), number of beaver captured, and trapping success in Michigan during 2007-2010.[a]

Variable	Year						Change[c] (%)
	2008		2009		2010		
	Estimate	95% CL[b]	Estimate	95% CL[b]	Estimate	95% CL[b]	
Trappers (No.)	1,223	40	1,218	39	1,306	44	7*
Trapping effort (Days)	30,578	1,897	31,455	2,031	29,736	1,905	-5
Beavers captured (No.)	15,270	1,169	15,273	1,173	13,423	1,066	-12
Trappers that captured a beaver (%)[d]	90	1	90	1	88	1	-2
Trappers using snares in open water (No.)[d]	NA	NA	69	13	75	14	9
Beaver caught with snares in open water (No.)[d]	NA	NA	128	51	191	63	50
Trapped beaver in April (Trappers)	508	31	527	32	492	33	-7
Beaver caught in April (No.)	5,361	652	5,253	618	5,551	772	6

[a]Furtakers trapping beaver were not required to obtain an otter harvest tag; thus, estimates associated with beaver trapping do not include all furtaker participation, effort, or harvest. These estimates only represent the participation, effort, or harvest of trappers that obtained an otter harvest tag.
[b]95% confidence limits.
[c]The change between 2009 and 2010 for proportion of trappers catching beaver is reported as the difference between years rather than the proportional change.
[d]Estimates not available prior to 2009.
*P<0.005.

Table 8. Estimated number of beaver trappers, trapping effort, and beaver captured by otter harvest tag holders during the 2010 Michigan trapping season, summarized by area.[a]

	Trappers		Trapping effort (days)		Beaver captured[a]		Trapper success	
Area	Total	95% CL[b]	Total	95% CL[b]	Total	95% CL[b]	%	95% CL[b]
Upper Peninsula	591	36	11,598	1,131	6,991	838	90	2
Lower Peninsula	758	39	17,716	1,601	6,076	643	87	2
Zone 2	536	35	11,979	1,252	4,570	510	90	2
Zone 3	275	26	5,737	883	1,506	285	80	4
Unknown	19	7	422	328	357	252	NA	NA
Statewide	1,306	44	29,736	1,905	13,423	1,066	88	1

[a]Furtakers trapping beaver were not required to obtain an otter harvest tag; thus, estimates associated with beaver trapping do not include all furtaker participation, effort, or harvest. These estimates only represent the participation, effort, or harvest of trappers that obtained an otter harvest tag.
[b]95% confidence limits.

Table 9. Estimated number of beaver trappers, trapping effort, and beaver captured by otter harvest tag holders during the 2010 Michigan trapping season, summarized by county.[a]

	Trappers		Trapping effort (days)		Beaver captured	
County	Total	95% CL[b]	Total	95% CL[b]	Total	95% CL[b]
Alcona	26	8	384	151	215	91
Alger	56	12	726	194	359	105
Allegan	2	2	17	22	3	4
Alpena	26	8	406	173	89	43
Antrim	9	5	126	85	36	27
Arenac	12	6	463	376	72	61
Baraga	46	11	816	265	442	154
Barry	20	7	242	113	48	24
Bay	12	6	181	103	38	22
Benzie	15	6	319	171	120	59
Berrien	2	2	7	9	3	4
Branch	0	0	0	0	0	0
Calhoun	9	5	123	87	39	45
Cass	5	4	188	157	34	30
Charlevoix	7	4	46	44	26	19
Cheboygan	26	8	697	320	186	76
Chippewa	92	16	1,346	300	1,154	378
Clare	53	12	895	260	340	115
Clinton	2	2	26	32	3	4
Crawford	20	7	282	145	92	51
Delta	36	10	622	207	309	144
Dickinson	29	9	480	183	333	141
Eaton	7	4	268	242	12	11
Emmet	10	5	162	100	80	49
Genesee	14	6	222	135	43	28
Gladwin	32	9	632	353	225	95
Gogebic	38	10	726	293	497	184
Gd. Traverse	19	7	306	173	50	29
Gratiot	3	3	19	17	9	9

[a]Furtakers trapping beaver were not required to obtain an otter harvest tag; thus, estimates associated with beaver trapping do not include all furtaker participation, effort, or harvest. These estimates only represent the participation, effort, or harvest of trappers that obtained an otter harvest tag.

[b]95% confidence limits.

Table 9 (continued). Estimated number of beaver trappers, trapping effort, and beaver captured by otter harvest tag holders during the 2010 Michigan trapping season, summarized by county.[a]

	Trappers		Trapping effort (days)		Beaver captured	
County	Total	95% CL[b]	Total	95% CL[b]	Total	95% CL[b]
Hillsdale	0	0	0	0	0	0
Houghton	51	12	864	260	335	119
Huron	0	0	0	0	0	0
Ingham	2	2	0	0	0	0
Ionia	10	5	242	169	44	28
Iosco	24	8	541	214	207	100
Iron	58	12	1,250	442	531	213
Isabella	15	6	157	79	46	24
Jackson	0	0	0	0	0	0
Kalamazoo	2	2	19	24	2	2
Kalkaska	29	9	659	248	164	63
Kent	10	5	172	136	3	4
Keweenaw	5	4	205	200	130	155
Lake	15	6	169	94	43	29
Lapeer	9	5	116	78	50	36
Leelanau	3	3	31	31	5	5
Lenawee	0	0	0	0	0	0
Livingston	3	3	12	12	3	4
Luce	55	12	791	254	577	237
Mackinac	36	10	738	285	278	140
Macomb	3	3	14	13	7	7
Manistee	27	9	755	336	171	88
Marquette	58	12	1,231	373	690	356
Mason	12	6	143	95	72	42
Mecosta	36	10	630	300	268	155
Menominee	17	7	249	112	102	53
Midland	22	8	372	190	131	52
Missaukee	50	12	686	244	432	162
Monroe	0	0	0	0	0	0

[a]Furtakers trapping beaver were not required to obtain an otter harvest tag; thus, estimates associated with beaver trapping do not include all furtaker participation, effort, or harvest. These estimates only represent the participation, effort, or harvest of trappers that obtained an otter harvest tag.
[b]95% confidence limits.

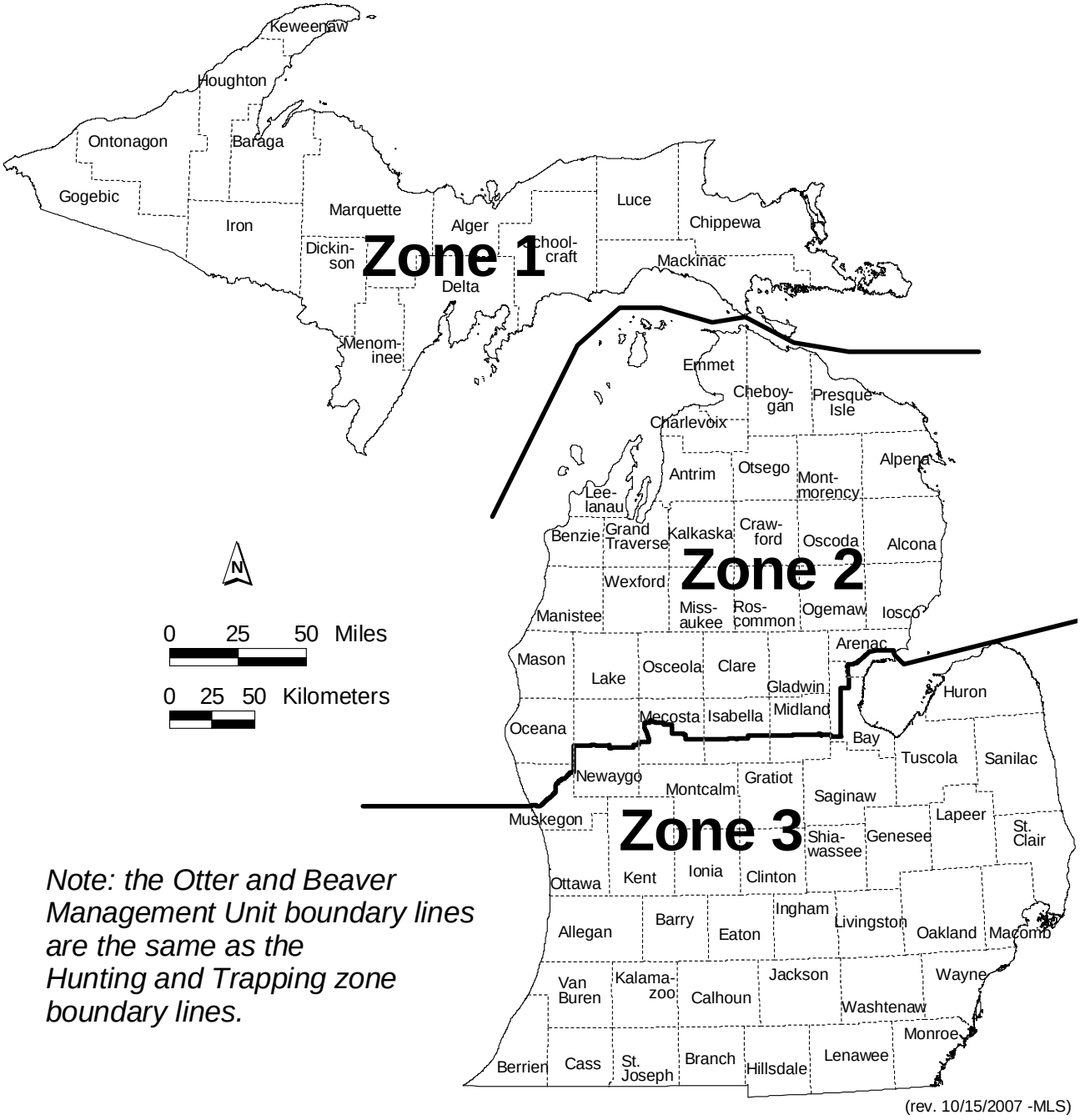
Table 9 (continued). Estimated number of beaver trappers, trapping effort, and beaver captured by otter harvest tag holders during the 2010 Michigan trapping season, summarized by county.[a]

	Trappers		Trapping effort (days)		Beaver captured	
County	Total	95% CL[b]	Total	95% CL[b]	Total	95% CL[b]
Montcalm	24	8	360	158	96	64
Montmorency	32	9	434	163	237	116
Muskegon	15	6	365	186	108	57
Newaygo	26	8	493	365	143	70
Oakland	17	7	261	142	92	57
Oceana	22	8	248	100	85	37
Ogemaw	12	6	415	243	283	164
Ontonagon	63	13	963	257	808	259
Osceola	36	10	750	329	350	151
Oscoda	36	10	464	164	290	114
Otsego	27	9	497	233	186	77
Ottawa	7	4	121	93	10	13
Presque Isle	27	9	493	229	143	57
Roscommon	38	10	632	244	237	95
Saginaw	20	7	405	191	94	48
St. Clair	2	2	9	11	0	0
St. Joseph	9	5	200	127	63	40
Sanilac	3	3	27	30	5	5
Schoolcraft	43	11	593	225	446	175
Shiawassee	7	4	56	41	20	16
Tuscola	10	5	388	289	75	50
Van Buren	3	3	24	21	12	15
Washtenaw	0	0	0	0	0	0
Wayne	0	0	0	0	0	0
Wexford	20	7	343	148	133	84
Unknown	19	7	422	328	357	252
Statewide[c]	1,306	44	29,736	1,905	13,423	1,066

[a]Furtakers trapping beaver were not required to obtain an otter harvest tag; thus, estimates associated with beaver trapping do not include all furtaker participation, effort, or harvest. These estimates only represent the participation, effort, or harvest of trappers that obtained an otter harvest tag.

[b]95% confidence limits.

[c]Number of trappers does not add up to statewide total because trappers could trap in more than one county. Column totals for trapping effort and capture may not equal statewide totals because of rounding errors.



Note: the Otter and Beaver Management Unit boundary lines are the same as the Hunting and Trapping zone boundary lines.

Figure 1. Otter and beaver management zones in Michigan, 2010.

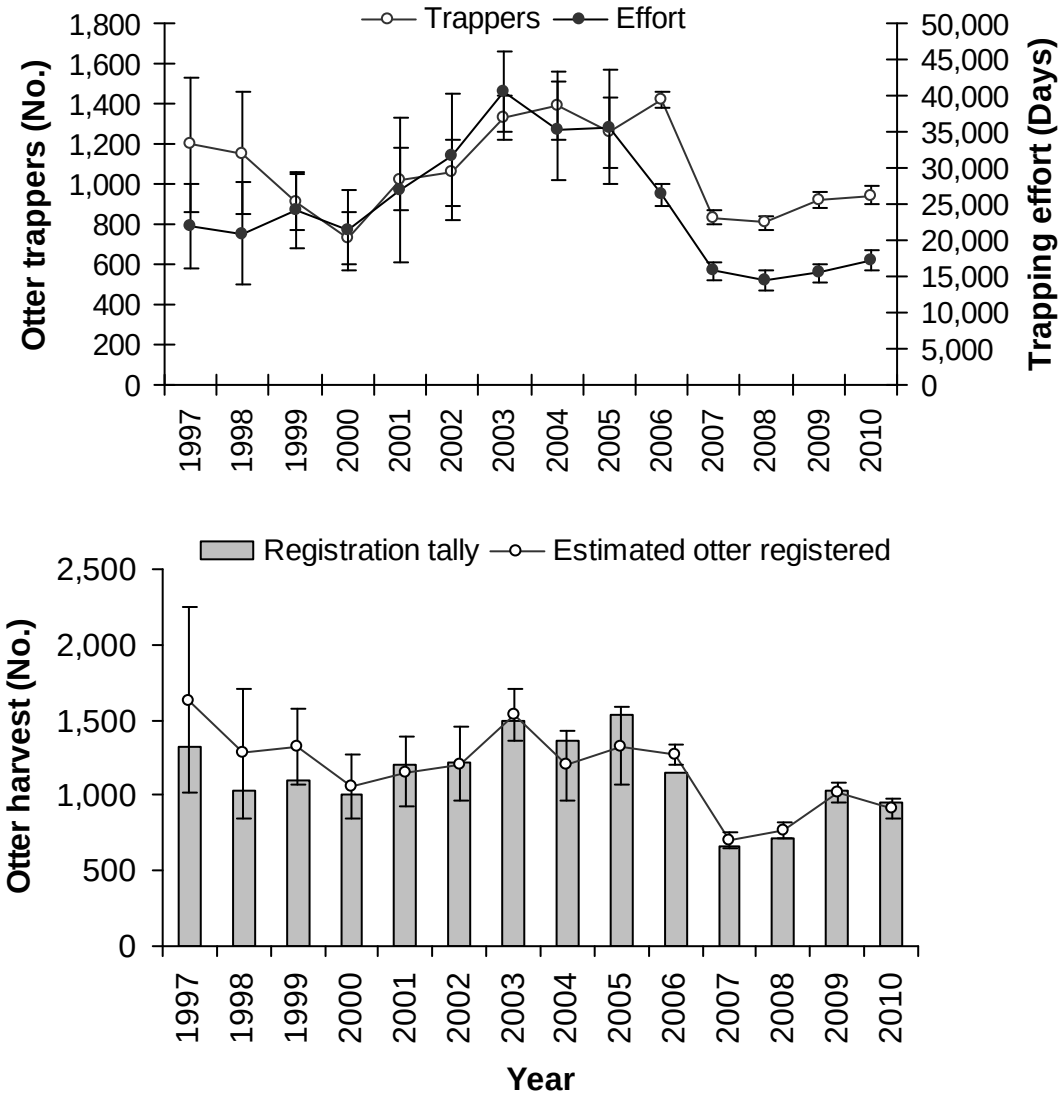


Figure 2. Estimated number of trappers, trapping effort (days), and number of otter captured and registered in Michigan, 1997-2010. Estimates of trapper numbers, trapping effort, and harvest were derived from harvest survey, while registration total was a tally of animals registered by trappers at registration stations (registration total included incidental catches not returned to trappers but excluded non-trapping mortality). Vertical bars represent the 95% confidence interval.

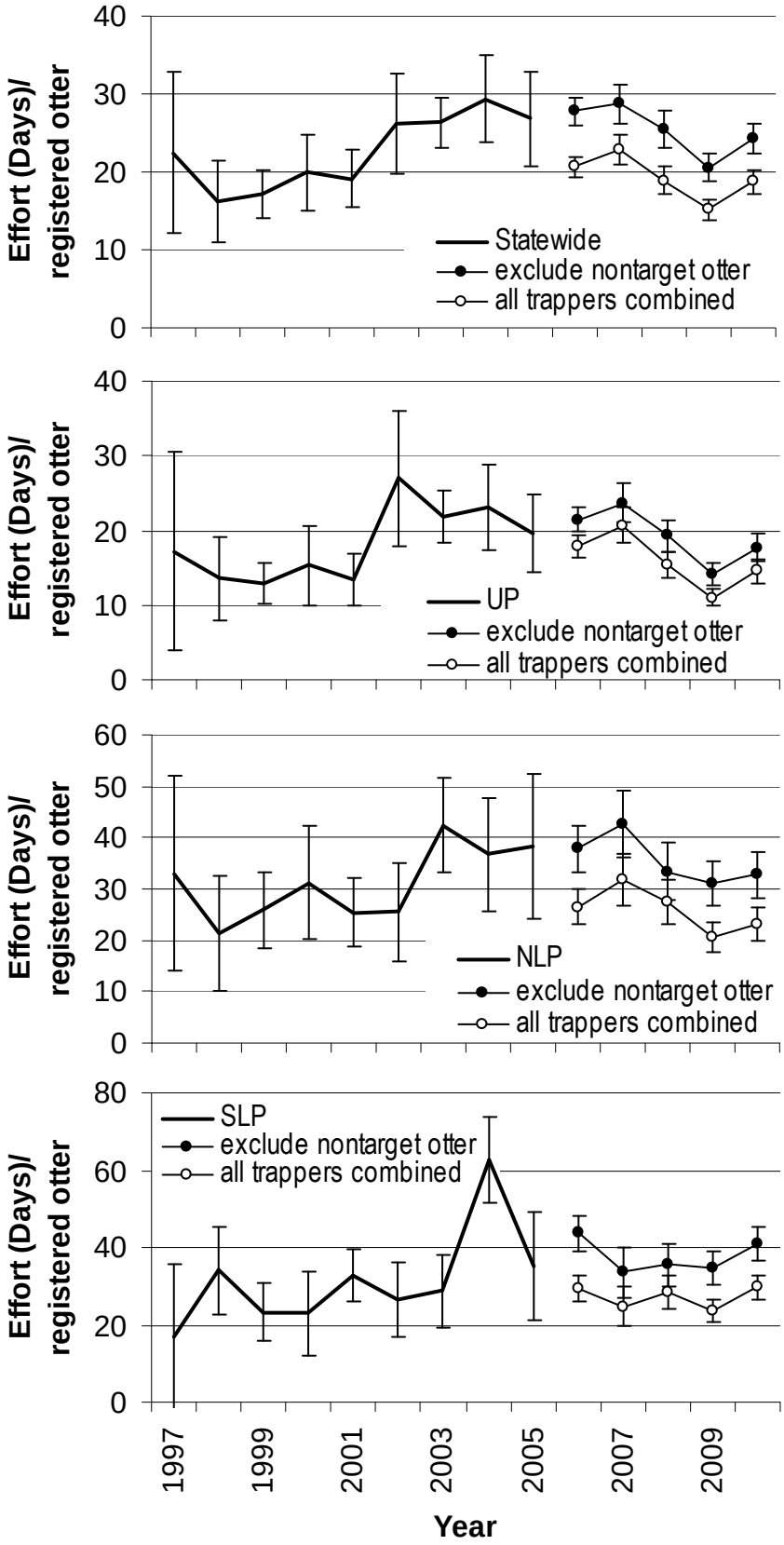


Figure 3. Estimated mean number of days required to harvest an otter in Michigan during 1997-2009, summarized by management zone. Beginning in 2006, two separate estimates were calculated: (1) an estimate excluding the activity of trappers that did not target otter and (2) an estimate of all trappers combined. The latter estimates are more comparable to estimates from previous years.

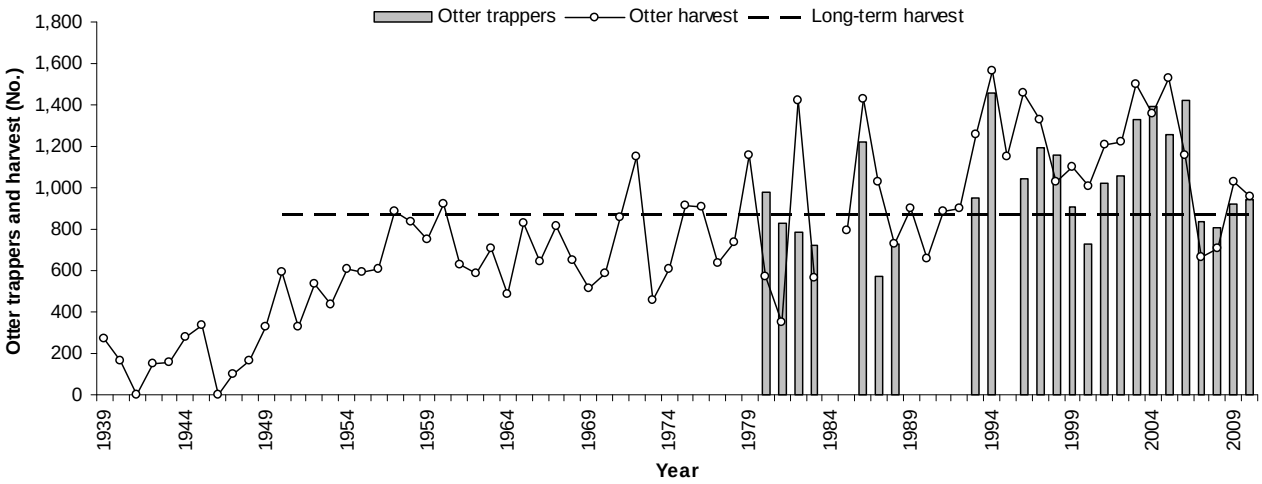


Figure 4. Otter harvest (sealing or registration tally, unpublished data) and estimated number of otter trappers (estimates from harvest survey) in Michigan, 1939-2010. Long-term (1950-2010) average harvest was 870 otter. Estimates were not available for years when values were not plotted.

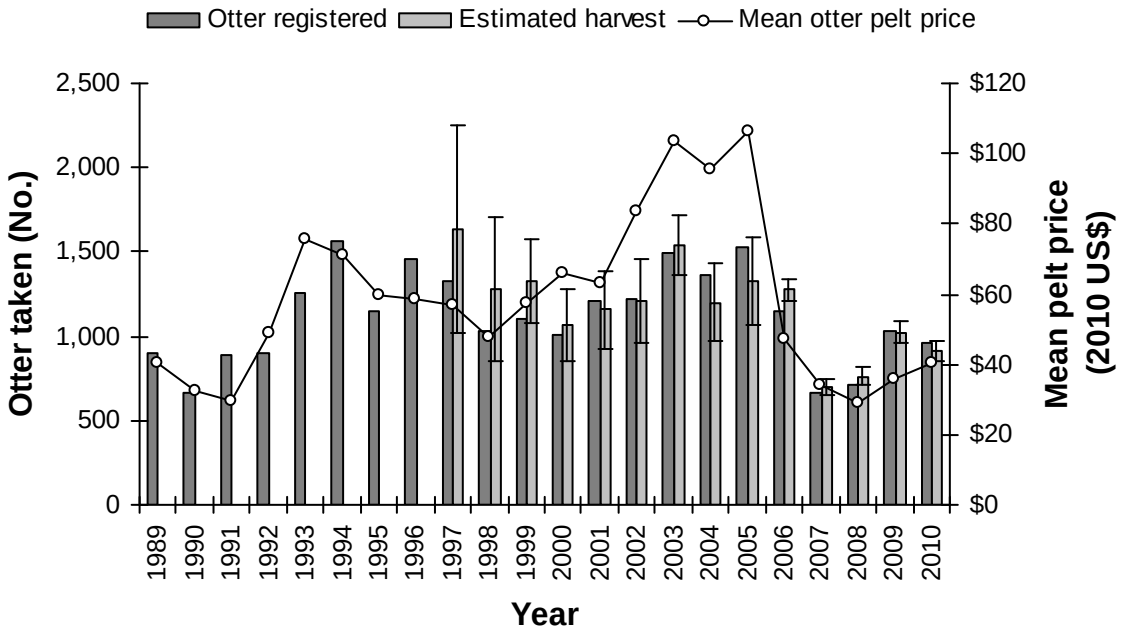


Figure 5. Otter registration totals, estimated otter harvest, and mean otter pelt prices in Michigan during 1989-2010. Mean pelt prices were the average paid in Minnesota and Wisconsin (Abraham and Dexter 2010, Dhuey 2010). Pelt prices were reported in 2010 dollars by adjusting for inflation using the Consumer Price Index (Bureau of Labor Statistics 2010). Vertical bars represent the 95% confidence interval. Estimates were not available for years when values were not plotted.

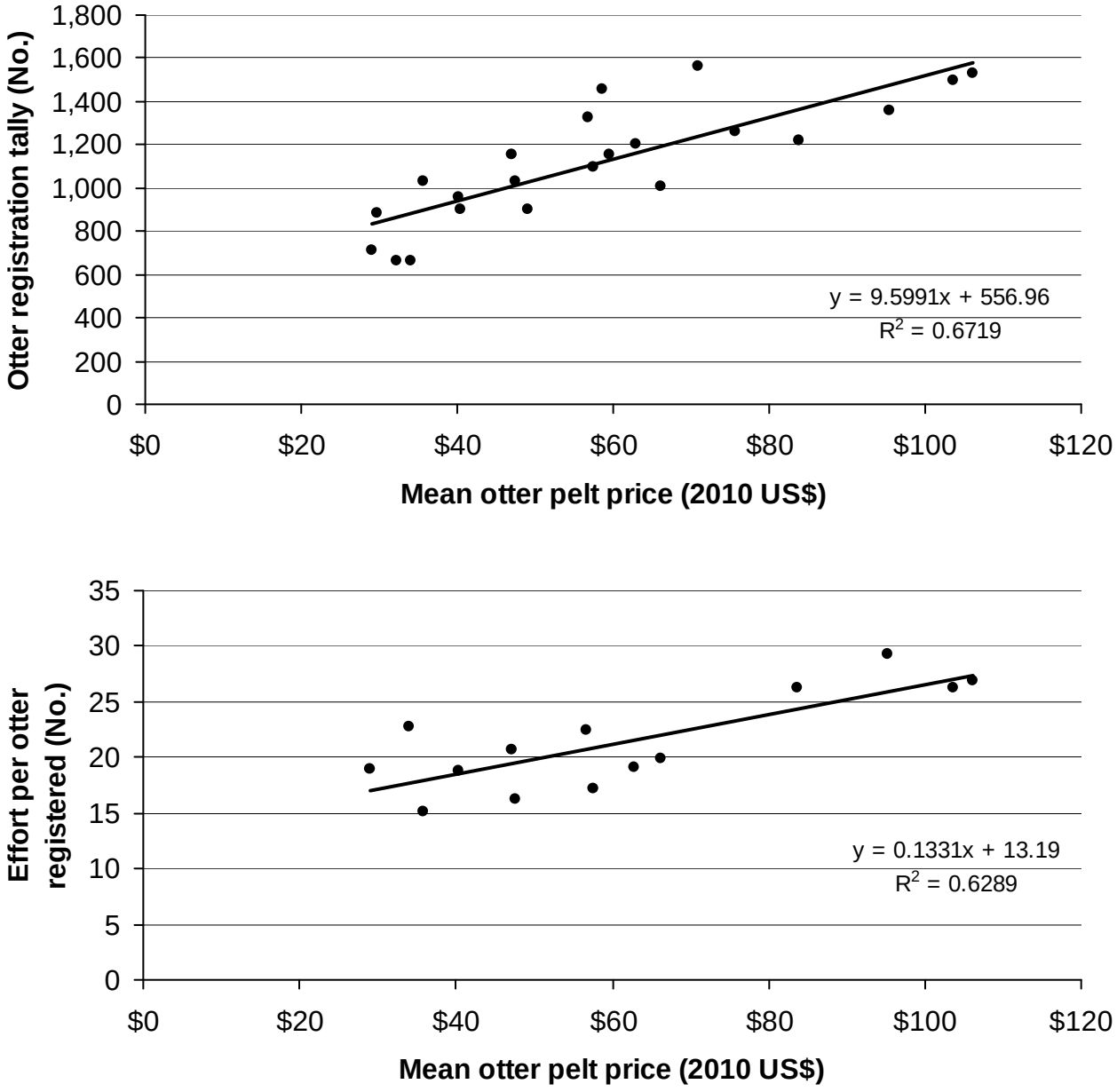


Figure 6. The relationship between the number of otter registered and mean otter pelt prices in Michigan during 1989-2009 (top), and the relationship between trapping effort per otter registered and mean otter pelt prices in Michigan during 1997-2009 (bottom).

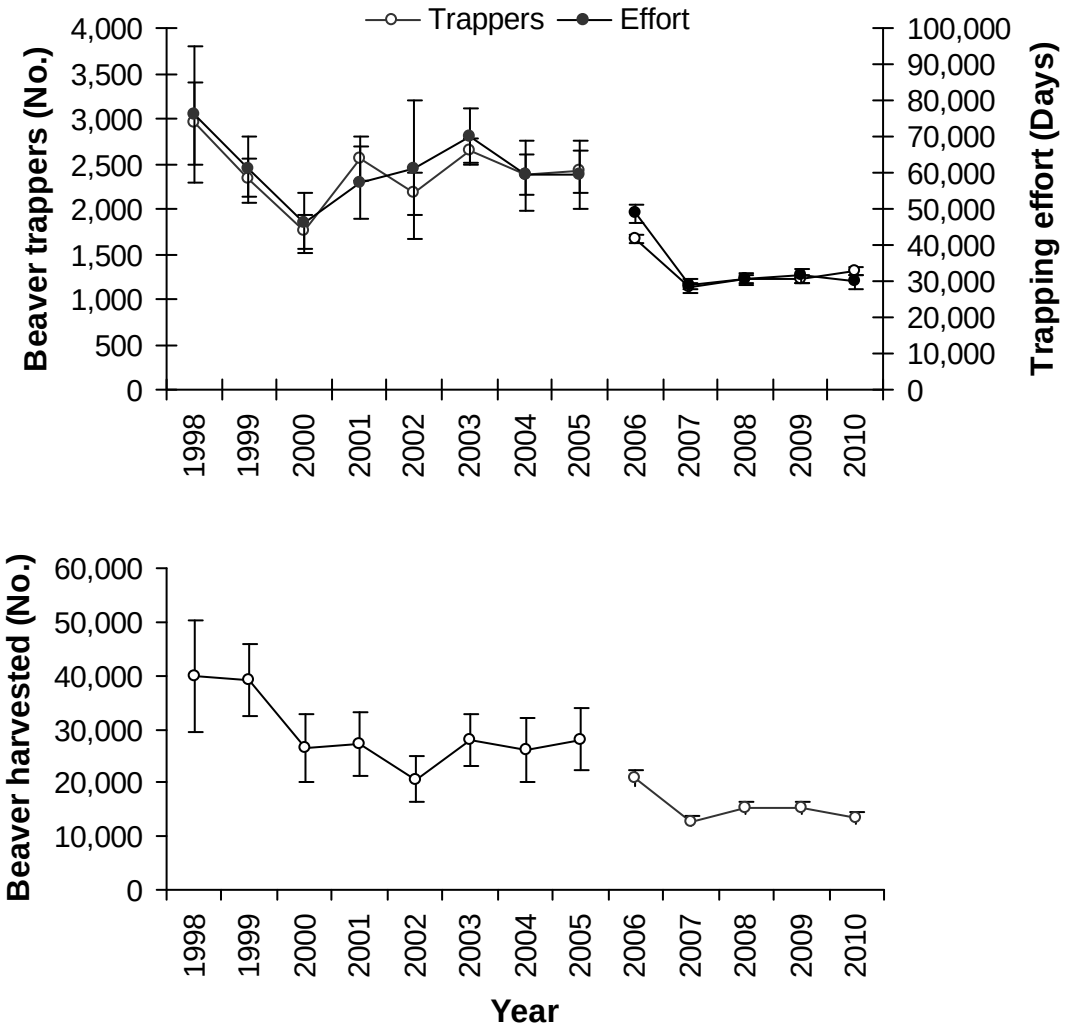


Figure 7. Estimated number of trappers, trapping effort (days), and number of beaver captured in Michigan, 1998-2010. Vertical bars represent the 95% confidence interval. The 2006-2010 estimates were not directly comparable to estimates from previous years because the 2006-2010 estimates only represent the participation, effort, and harvest of trappers that obtained an otter harvest tag. Also beginning in 2003, trappers taking beaver as part of a nuisance control business were asked to exclude nuisance animals from their reported harvest on annual harvest surveys.

Appendix A. Questionnaire used to collect data for 2010 otter and beaver harvest survey in Michigan.

MICHIGAN DEPARTMENT OF NATURAL RESOURCES, WILDLIFE DIVISION

2010-11 OTTER AND BEAVER HARVEST REPORT

PO BOX 30030 LANSING MI 48909-7530

This information is requested under authority of Part 435, 1994 PA 451, M.C.L. 324.43539.

It is important that you complete and return this questionnaire even if you did not trap or capture any otter or beaver.

1. Did you place traps specifically for <u>otter</u> during the 2010-11 season?

[1] ☐ Yes [2] ☐ No, *Skip to question number 5.*

2. If you trapped during the 2010-11 <u>otter</u> season, please complete the following table.
(*Do not report trapping done as part of a nuisance control business.)*

COUNTY TRAPPED (List each county that you trapped for otter.)	**NUMBER OF DAYS TRAPPED FOR OTTER**	**NUMBER OF OTTER CAUGHT AND RELEASED** (Count only otters you released alive from your traps.)	**NUMBER OF OTTER CAUGHT AND REGISTERED** (Count all otter that were registered including incidental catches that were not returned to you.)

3. How many of the following traps did you set for <u>otter</u> in 2010-11?
(For each type, record the average number used per day.)

_____ Foothold
_____ Conibear

4. What is the status of <u>otter</u> in the county you trapped most often in 2010-11?

[1] ☐ Increasing [2] ☐ Decreasing [3] ☐ Stable [4] ☐ Not present

5. Did you incidentally catch any otter while trapping for other species that you have not already reported in Question #2.

[1] ☐ Yes [2] ☐ No, *Skip to question number 7.*

6. If you answered yes in the previous question, please report the location and number of incidental otters you captured. Please do not report otter already reported in question #2.

COUNTY WHERE INCIDENTAL OTTER CAUGHT (List each county that you caught an incidental otter.)	**NUMBER OF INCIDENTAL OTTER CAUGHT AND RELEASED** (Count only incidental otters you released alive from your traps.)	**NUMBER OF INCIDENTAL OTTER CAUGHT AND REGISTERED** (Count incidental otter that were registered including catches that were not returned to you.)

Questions continued on reverse side.

7. Did you place traps for <u>beaver</u> during the 2010-11 season?

[1] ☐ Yes [2] ☐ No, *skip to question 14.*

8. If you trapped during the 2010-11 <u>beaver</u> season, please complete the following table.
(*Do not report trapping done as part of a nuisance control business.)*

COUNTY TRAPPED (List each county that you trapped for beaver.)	**NUMBER OF DAYS TRAPPED FOR BEAVER**	**NUMBER OF BEAVER CAUGHT**

9. How many of the following traps did you set for <u>beaver</u> in 2010-11?
(For each type, record the average number used per day.)

_____ Foothold
_____ Conibear
_____ Snares

10. Did you attempt to trap beavers with snares in open water during the 2010-11 seasons?

[1] ☐ Yes [2] ☐ No (*Skip to Question 11*)

10a. If you attempted to trap beavers with snares in open water, how many beavers did you harvest with these sets during the 2010-11 seasons? _____ **BEAVER TAKEN**

11. Did you attempt to trap beavers during April 2010?

[1] ☐ Yes [2] ☐ No (*Skip to Question 12*)

11a. If you attempted to trap beavers during April 2010, how many beavers did you harvest in April? _____ **BEAVER TAKEN**

12. What is the status of <u>beaver</u> in the county you trapped most often in 2010-11?

[1] ☐ Increasing [2] ☐ Decreasing [3] ☐ Stable [4] ☐ Not present

13. Did you catch any <u>otter</u> in traps that were set for beaver in 2010-11?

[1] ☐ Yes [2] ☐ No (*Skip to Question 14*)

13a. If you answered yes, report number of <u>otter</u> caught in your beaver sets.

_____ otter caught in beaver sets

14. Do you have any comments or suggestions about otter or beaver management in Michigan?

_____
_____
_____
_____

Please return questionnaire in the enclosed postage-paid envelope.
Thank you for your help!